Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL QUALITY MEASURES CLEARINGHOUSE

# General

## Title

Diagnosis and management of type 2 diabetes mellitus (T2DM) in adults: percentage of patients ages 18 to 75 years old with T2DM who are optimally managed, according to the specified components.

## Source(s)

Redmon B, Caccamo D, Flavin P, Michels R, O'Connor P, Roberts J, Smith S, Sperl-Hillen J. Diagnosis and management of type 2 diabetes mellitus in adults. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2014 Jul. 85 p. [197 references]

# Measure Domain

## Primary Measure Domain

Clinical Quality Measures: Outcome

## Secondary Measure Domain

Clinical Quality Measure: Process

# Brief Abstract

## Description

This measure is used to assess the percentage of patients ages 18 to 75 years old with type 2 diabetes mellitus (T2DM) who achieve any or all of the following control criteria:

Glycated hemoglobin (HgbA1c) less than 8%
Most recent blood pressure measurement less than 140/90 mmHg
Tobacco free
Established atherosclerotic cardiovascular disease (ASCVD) with documented daily aspirin use (unless contraindicated)
Ages 40 to 75 years with T2DM and untreated low-density lipoprotein (LDL) greater than 70 mg/dL who are prescribed statin therapy
All of the above

This measure represents the composite rate. This measure should be calculated as both an individual component met and a composite (all components met at the same time) measure. See the "Basis for

Disaggregation" field for details.

## Rationale

The priority aim addressed by this measure is to increase the percentage of patients ages 18 to 75 years with type 2 diabetes mellitus (T2DM) who are optimally managed.

Due to the high percentage of the United States (U.S.) population that is diagnosed with diabetes and the effect diabetes has on other comorbidities, appropriate management will improve the patient's experience of care and the health of the population, reducing office visits, emergency department visits, and cardiovascular complications. Other related conditions will in turn reduce the total cost of care.

Appropriate medication management targeting glycemic control, hypertension, and lipid management is important for reducing morbidity and mortality, and improving long-term quality of life for patients diagnosed with T2DM. Lifestyle changes such as nutrition therapy, weight loss, increased exercise, and appropriate education and self-management strategies are pivotal to improved outcomes. Inadequate access to care for chronic disease management as well as the cost of medication can contribute to poor control of T2DM and associated cardiovascular risk factors.

For most chronic diseases, including diabetes, the most efficient improvement strategy is to focus on a limited number of specific improvement goals. These may be based on observed gaps in care, potential clinical impact, cost considerations or other criteria (O'Connor, 2005). In T2DM, focusing on glycemic control, lipid control and blood pressure control is a strategy that has been shown to be effective in preventing up to 53% of heart attacks and strokes, the leading drivers of excess mortality and costs in adults with diabetes (Gaede et al., 2003).

## Evidence for Rationale


Gaede P, Vedel P, Larsen N, Jensen GV, Parving HH, Pedersen O. Multifactorial intervention and cardiovascular disease in patients with type 2 diabetes. N Engl J Med. 2003 Jan 30;348(5):383-93. PubMed

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Redmon B, Caccamo D, Flavin P, Michels R, O'Connor P, Roberts J, Smith S, Sperl-Hillen J. Diagnosis and management of type 2 diabetes mellitus in adults. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2014 Jul. 85 p. [197 references]


## Primary Health Components

Type 2 diabetes mellitus (T2DM); atherosclerotic cardiovascular disease (ASCVD); glycated hemoglobin (HgbA1c); blood pressure; low-density lipoprotein (LDL); statin therapy; tobacco use; aspirin use

## Denominator Description

Number of patients ages 18 to 75 years old with type 2 diabetes mellitus (T2DM) (see the related "Denominator Inclusions/Exclusions" field)

## Numerator Description

Number of patients who achieve all of the following control criteria:

Glycated hemoglobin (A1c) less than 8%
Most recent blood pressure measurement less than 140/90 mmHg
Tobacco free
Established atherosclerotic cardiovascular disease (ASCVD) with documented daily aspirin use (unless contraindicated)
Ages 40 to 75 years with type 2 diabetes mellitus (T2DM) with untreated low-density lipoprotein (LDL) greater than 70 mg/dL who are prescribed statin therapy

# Evidence Supporting the Measure

## Type of Evidence Supporting the Criterion of Quality for the Measure

A clinical practice guideline or other peer-reviewed synthesis of the clinical research evidence

## Additional Information Supporting Need for the Measure

- Diabetes is a chronic disease that afflicts approximately 26.9% of United States (U.S.) residents aged 65 years and older. 1.9 million are diagnosed with diabetes every year, and an additional 7.0 million go undiagnosed and untreated (Centers for Disease Control and Prevention [CDC], 2011). More than 1 in 5 health care dollars in the U.S. goes to the care of people with diagnosed diabetes, costing $245 billion dollars annually.
- The benefits of a multifactorial approach to diabetes care are supported by the results of the Steno 2 Study of 160 patients with type 2 diabetes mellitus (T2DM) and microalbuminuria. Multifactorial interventions achieved a 50% reduction in mortality and significant reduction in microvascular complications five years after ending a 7.8-year multifactorial intervention that achieved glycated hemoglobin (A1c) of 7.8%, low-density lipoprotein (LDL) 83 mg/dL, blood pressure (BP) 131/73, compared to a conventional group that achieved A1c 9%, LDL 126 mg/dL and BP 146/78 (Gaede et al., 2008). Results of this study are consistent with the need for reasonable blood glucose control with emphasis on blood pressure and lipid management.
- Hospitalized patients with diabetes suffer increased morbidity, mortality, length of stay, and other related hospital costs compared to non-hyperglycemic inpatients (Umpierrez et al., 2002).
- Hyperglycemia has been associated with increased infection rates and poorer short-term and long-term outcomes in critically ill patients in the intensive care unit, post-myocardial infarction, and post-surgical settings (van den Berghe et al., 2001).
- There is a substantial increase in the prevalence of depression among people with diabetes as compared to the general adult population (Anderson et al., 2001). Depression impacts the ability of a person with diabetes to achieve blood glucose control, which in turn impacts the rate of development of diabetes complications (de Groot et al., 2001; Lustman & Gavard, 2001).
- Sleep apnea is a prevalent condition in obese patients with type 2 diabetes and is associated with significant comorbidities including hypertension, cardiovascular disease and insulin resistance.
- Up to 21% of patients with T2DM are found to have retinopathy at the time of diagnosis of diabetes mellitus (Fong et al., 2004). Generally retinopathy progresses from mild background abnormalities to preproliferative retinopathy to proliferative retinopathy.
- Achieving near-normal glycemic control lowers risk of diabetes microvascular complications such as retinopathy, nephropathy and amputations. Achieving A1c of 6.9 to 7.9% may also significantly reduce macrovascular complications based on Steno-2 and UK Prospective Diabetes Study (UKPDS) data (Hemmingsen et al., 2013; Callaghan et al., 2012; Anderson et al., 2011; Action to Control Cardiovascular Risk in Diabetes Study Group et al., 2008; ACCORD Study Group et al., 2010; Ismail-Beigi et al., 2010; Duckworth et al., 2009; NICE-SUGAR Study Investigators et al., 2009; Ray et al., 2009; Turnbull et al., 2009; Abraira et al., 2009; ADVANCE Collaborative Group et al., 2008; Gaede et al., 2008; Holman et al., 2008).
- Tobacco smoking increases risk of macrovascular complications 4% to 400% in adults with T2DM and

also increases risk of macrovascular complications. Tobacco cessation is very likely to be the single most beneficial intervention that is available, and it should be emphasized by clinicians.
- Uncontrolled hypertension is a major cardiovascular risk factor that also accelerates the progression of diabetic nephropathy (Morrish et al., 1991).
- Seventy to seventy-five percent of adult patients with diabetes die of macrovascular disease, specifically coronary, carotid and/or peripheral vascular disease. In most patients with diabetes, use of a statin can reduce major vascular events.

## Evidence for Additional Information Supporting Need for the Measure


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Redmon B, Caccamo D, Flavin P, Michels R, O'Connor P, Roberts J, Smith S, Sperl-Hillen J. Diagnosis and management of type 2 diabetes mellitus in adults. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2014 Jul. 85 p. [197 references]

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## Extent of Measure Testing

Unspecified

### National Guideline Clearinghouse Link

Diagnosis and management of type 2 diabetes mellitus in adults.

## State of Use of the Measure

### State of Use

Current routine use

### Current Use

not defined yet

## Application of the Measure in its Current Use

### Measurement Setting

Ambulatory/Office-based Care

### Professionals Involved in Delivery of Health Services

not defined yet

### Least Aggregated Level of Services Delivery Addressed

Clinical Practice or Public Health Sites

### Statement of Acceptable Minimum Sample Size

Unspecified

### Target Population Age

Age 18 to 75 years

### Target Population Gender

Either male or female

## National Strategy for Quality Improvement in Health Care

### National Quality Strategy Aim

Better Care

### National Quality Strategy Priority

Prevention and Treatment of Leading Causes of Mortality

## Institute of Medicine (IOM) National Health Care Quality Report Categories

### IOM Care Need

Living with Illness

### IOM Domain

Effectiveness

## Data Collection for the Measure

### Case Finding Period

The time frame pertaining to data collection is the past 12 months.

### Denominator Sampling Frame

Patients associated with provider

### Denominator (Index) Event or Characteristic

Clinical Condition

Encounter

Patient/Individual (Consumer) Characteristic

### Denominator Time Window

not defined yet

### Denominator Inclusions/Exclusions

Inclusions
Number of patients ages 18 to 75 years old who have type 2 diabetes mellitus (T2DM)

Data Collection: Data should be collected from electronic medical records (EMR) for all patient visits in the past 12 months.

Exclusions
Unspecified

## Exclusions/Exceptions

not defined yet

## Numerator Inclusions/Exclusions

Inclusions
Number of patients who achieve all of the following control criteria:

- Glycated hemoglobin (HgbA1c) less than 8%
- Most recent blood pressure measurement less than 140/90 mmHg
- Tobacco free
- Established atherosclerotic cardiovascular disease (ASCVD) with documented daily aspirin use (unless contraindicated)
- Ages 40 to 75 years with type 2 diabetes mellitus (T2DM) and untreated low-density lipoprotein (LDL) greater than 70 mg/dL who are prescribed statin therapy

Exclusions
Unspecified

## Numerator Search Strategy

Fixed time period or point in time

## Data Source

Electronic health/medical record

## Type of Health State

Physiologic Health State (Intermediate Outcome)

## Instruments Used and/or Associated with the Measure

Unspecified

# Computation of the Measure

## Measure Specifies Disaggregation

Measure is disaggregated into categories based on different definitions of the denominator and/or numerator

## Basis for Disaggregation

This measure is disaggregated based on different definitions of the denominator and numerator. This measure should be calculated as both an individual component met and a composite (all components met at the same time) measure.

Denominators:

Number of patients ages 18 to 75 years old who have type 2 diabetes mellitus (T2DM)
Number of patients ages 18 to 75 years old who have T2DM
Number of patients ages 18 to 75 years old who have T2DM
Number of patients ages 18 to 75 years old who have T2DM and established atherosclerotic cardiovascular disease (ASCVD)
Number of patients ages 40 to 75 years old who have T2DM and untreated low-density lipoprotein (LDL) greater than 70 mg/dL
Number of patients ages 18 to 75 years old who have T2DM

Numerators:

Number of patients with glycated hemoglobin (HgbA1c) less than 8%
Number of patients with most recent blood pressure measurement less than 140/90 mmHg
Number of patients who are tobacco free
Number of patients with established ASCVD with documented daily aspirin use (unless contraindicated)
Number of patients ages 40 to 75 years with type 2 diabetes and untreated LDL greater than 70 mg/dL who are prescribed statin therapy
Number of patients with all of the above

## Scoring

Composite/Scale

Rate/Proportion

## Interpretation of Score

Desired value is a higher score

## Allowance for Patient or Population Factors

not defined yet

## Standard of Comparison

not defined yet

# Identifying Information

## Original Title

Diabetes optimal care.

## Measure Collection Name

Diagnosis and Management of Type 2 Diabetes Mellitus in Adults

## Submitter

Institute for Clinical Systems Improvement - Nonprofit Organization

## Developer

Institute for Clinical Systems Improvement - Nonprofit Organization

## Funding Source(s)

The Institute for Clinical Systems Improvement's (ICSI's) work is funded by the annual dues of the member medical groups and five sponsoring health plans in Minnesota and Wisconsin.

## Composition of the Group that Developed the Measure

*Work Group Members*: Bruce Redmon, MD (*Work Group Leader*) (University of Minnesota) (Endocrinology); David Caccamo, MD (HealthPartners Medical Group and Regions Hospital) (Family Medicine); Ryan Michels, PharmD, BCPS (HealthPartners Medical Group and Regions Hospital) (Pharmacy); Patrick O'Connor, MD (HealthPartners Medical Group and Regions Hospital) (Family Medicine); Julie Roberts, MS, RD, CDE (HealthPartners Medical Group and Regions Hospital) (Health Education); JoAnn Sperl-Hillen, MD (HealthPartners Medical Group and Regions Hospital) (Internal Medicine); Steve Smith, MD (Mayo Clinic) (Endocrinology); Penny Louise Flavin, DNP, RN, CNP (Olmsted Medical Center) (Family Practice); Cassie Myers (Institute for Clinical Systems Improvement [ICSI]) (Project Manager); Linda Setterlund, MA, CPHQ (ICSI) (Clinical Systems Improvement Facilitator)

## Financial Disclosures/Other Potential Conflicts of Interest

The Institute for Clinical Systems Improvement (ICSI) has long had a policy of transparency in declaring potential conflicting and competing interests of all individuals who participate in the development, revision and approval of ICSI guidelines and protocols.

In 2010, the ICSI Conflict of Interest Review Committee was established by the Board of Directors to review all disclosures and make recommendations to the board when steps should be taken to mitigate potential conflicts of interest, including recommendations regarding removal of work group members. This committee has adopted the Institute of Medicine Conflict of Interest standards as outlined in the report Clinical Practice Guidelines We Can Trust (2011).

Where there are work group members with identified potential conflicts, these are disclosed and discussed at the initial work group meeting. These members are expected to recuse themselves from related discussions or authorship of related recommendations, as directed by the Conflict of Interest committee or requested by the work group.

The complete ICSI policy regarding Conflicts of Interest is available at the ICSI Web site .

Disclosure of Potential Conflicts of Interest

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Guideline Related Activities: None
Research Grants: None
Financial/Non-Financial Conflicts of Interest: None

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Guideline Related Activities: None
Research Grants: None
Financial/Non-Financial Conflicts of Interest: None

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Guideline Related Activities: None
Research Grants: None
Financial/Non-Financial Conflicts of Interest: None

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National, Regional, Local Committee Affiliations: None
Guideline Related Activities: Lipid Management in Adults, Diagnosis and Treatment of Hypertension
Research Grants: Received institutional payment for research grants from NIH (National Institutes of Health), AHRQ (Agency for Healthcare Research and Quality, NIMH (National Institute of Mental Health), NHLBI (National Heart, Lung and Blood Institute) and to develop standards of diabetes care for American Diabetes Association
Financial/Non-Financial Conflicts of Interest: None

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National, Regional, Local Committee Affiliations: None
Guideline Related Activities: None
Research Grants: NIH (National Institutes of Health) related to ongoing diabetes clinical trial, including the Look Ahead study and GRADE study
Financial/Non-Financial Conflicts of Interest: Consults for the University of Minnesota and Optum Insight and is paid directly to the physician's employer

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Guideline Related Activities: None
Research Grants: None
Financial/Non-Financial Conflicts of Interest: None

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Guideline Related Activities: None
Research Grants: None
Financial/Non-Financial Conflicts of Interest: None

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National, Regional, Local Committee Affiliations: None
Guideline Related Activities: Has served on guideline group for BMJ Online T2DM guideline
Research Grants: Receives programmatic support paid to her institution for the following: Stimulated Diabetes Training for Resident Physicians (NIDDK funded), Primary investigator; Personalized Physician Learning for HTN (NHLBI), co-investigator; Priorities (NHLBI), co-investigator; Hyperlink (NHLBI), co-investigator; travel and expenses paid for by an educational grant from Sanofi through the International Diabetes Center
Financial/Non-Financial Conflicts of Interest: None

## Adaptation

This measure was not adapted from another source.

## Date of Most Current Version in NQMC

2014 Jul

## Measure Maintenance

Scientific documents are revised every 12 to 24 months as indicated by changes in clinical practice and literature.

## Date of Next Anticipated Revision

The next scheduled revision will occur within 24 months.

## Measure Status

This is the current release of the measure.

This measure updates a previous version: Riethof M, Flavin PL, Lindvall B, Michels R, O'Connor P, Redmon P, Retzer K, Roberts J, Smith S, Sperl-Hillen J, Institute for Clinical Systems Improvement (ICSI). Diagnosis and management of type 2 diabetes mellitus in adults. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2012 Apr. 141 p.

The measure developer reaffirmed the currency of this measure in January 2016.

## Measure Availability

Source available for purchase from the Institute for Clinical Systems Improvement (ICSI) Web site . Also available to ICSI members for free at the ICSI Web site and to Minnesota health care organizations free by request at the ICSI Web site .

For more information, contact ICSI at 8009 34th Avenue South, Suite 1200, Bloomington, MN 55425; Phone: 952-814-7060; Fax: 952-858-9675; Web site: www.icsi.org ; E-mail: icsi.info@icsi.org.

## NQMC Status

This NQMC summary was completed by ECRI Institute on May 6, 2013.

This NQMC summary was updated by ECRI Institute on January 5, 2015.

The information was reaffirmed by the measure developer on January 13, 2016.

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# Production

## Source(s)

Redmon B, Caccamo D, Flavin P, Michels R, O'Connor P, Roberts J, Smith S, Sperl-Hillen J. Diagnosis and management of type 2 diabetes mellitus in adults. Bloomington (MN): Institute for Clinical Systems Improvement (ICSI); 2014 Jul. 85 p. [197 references]

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